

Amendment to the Claims:

1-13. (Cancelled)

14. (Currently Amended) The apparatus as set forth in claim ~~[[13]]~~ 17 further including:

a cooler for cooling the material which has been irradiated in the irradiation chamber.

15. (Currently Amended) The apparatus as set forth in claim ~~[[13]]~~ 17 wherein the radiation source includes:

a particle accelerator ~~which accelerates~~ for accelerating electrons; and

5 a scan horn ~~which fans~~ for fanning the electrons into an electron beam directed into the irradiation chamber.

16. (Currently Amended) The apparatus as set forth in claim ~~[[13]]~~ 17 wherein the radiation source is a pulsed electron accelerator.

17. (Currently Amended) ~~An~~ The apparatus ~~as set forth in claim 13~~ further including: for irradiating fluoropolymer materials comprising:

a radiation source for generating a beam of radiation;

an irradiation chamber through which the beam of radiation passes;

5 a vacuum pump for drawing down oxygen and oxygen containing gases from the irradiation chamber;

a source of fluoropolymer material for supplying fluoropolymer material to the irradiation chamber;

10 at least one of magnets and electromagnetic coils disposed adjacent the irradiation chamber for reorienting the fluoropolymer material.

18. (Currently Amended) ~~An~~ The apparatus as set forth in claim 13 ~~further including: for irradiating fluoropolymer materials comprising:~~

an entraining mechanism for entraining particulate fluoropolymer material into a stream of oxygen depleted gas;

5 a pneumatic conduit for conveying entrained fluoropolymer material from the entraining mechanism to an the irradiation chamber and maintaining the fluoropolymer material entrained in the oxygen depleted gas while in the irradiation chamber;

10 a radiation source for generating a beam of radiation and directing the beam of radiation through the irradiation chamber to irradiate the particulate fluoropolymer material while the fluoropolymer material is entrained in the oxygen depleted gas;

a separator disposed downstream from the irradiation chamber for separating the fluoropolymer material from the entraining gas;

15 another pneumatic conduit ~~which conveys~~ for conveying the oxygen depleted gas from the separator back to the entraining mechanism; and

a pump for circulating the oxygen depleted gas.

19. (Original) The apparatus as set forth in claim 18 further including:
a chiller disposed between the irradiation chamber and the separator.

20. (Currently Amended) The apparatus as set forth in claim ~~[[13]]~~ 17 wherein the irradiation chamber with received fluoropolymer material is pumped down to a vacuum of at least 10^{-1} Torr and further including a conveyor for conveying the irradiation chamber through the radiation beam.

21. (Previously Added) An apparatus for irradiating fluoropolymer materials, the apparatus comprising:

a means for removing oxygen and oxygen-containing gases from an irradiation zone to create an oxygen and oxygen-containing gas depleted environment;

5 a means for applying at least one of electric and magnetic fields across the irradiation zone;

 a means for pulsing accelerated electrons through the irradiation zone.

22. (Currently Amended) An apparatus for irradiating fluoropolymer material, the apparatus comprising:

~~an irradiation zone which receives fluoropolymer material;~~

 an electron accelerator for generating and sending a beam of accelerated
5 electrons through the an irradiation zone breaking chemical bonds of the fluoropolymer material received in the irradiation zone and electrically charging the received fluoropolymer material;

 a means disposed adjacent the irradiation zone for applying at least one of electromagnetic and electrostatic fields which cause the charged fluoropolymer
10 material in the irradiation zone to rotate.

23. (Currently Amended) An apparatus for irradiating fluoropolymer material, the apparatus comprising:

 a means for entraining pieces of fluoropolymer in gas depleted of oxygen and oxygen-containing gases;

5 a means for passing the entrained fluoropolymer material through an irradiation zone and maintaining the fluoropolymer material entrained in the gas in the irradiation zone;

 an electron source ~~which irradiates for irradiating~~ the entrained fluoropolymer material in the irradiation zone with accelerated electrons;

10 a means for separating the entrained, irradiated fluoropolymer pieces from the gas;

 a gas recirculation loop ~~which recirculates~~ connected with the entraining means such that the gas is recirculated through the gas recirculation loop to the entraining means.

24. (Currently Amended) An apparatus for irradiating fluoropolymer material, the apparatus comprising:

an irradiation chamber through which polymer material to be irradiated is passed;

5 a source of gas ~~which is~~ depleted in oxygen and oxygen-containing gases, the gas source being connected with the irradiation chamber to create and maintain an oxygen and oxygen-containing gas depleted environment in the irradiation chamber;

an electron accelerator ~~which~~ configured and disposed to intermittently ~~sends~~ send pulses of accelerated electrons through the irradiation chamber providing
10 alternate irradiation and cooling periods for the fluoropolymer; and,

an electric circuit ~~which applies~~ for applying at least one of electromagnetic and electrostatic fields across the irradiation chamber.